



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>5</sup> :</b>  <b>G06K 19/077</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 94/11846</b>  <b>(43) International Publication Date:</b> 26 May 1994 (26.05.94)
<b>(21) International Application Number:</b> PCT/FI93/00468 <b>(22) International Filing Date:</b> 9 November 1993 (09.11.93)  <b>(30) Priority data:</b> 925077 9 November 1992 (09.11.92) FI  <b>(71)(72) Applicant and Inventor:</b> ROBERTSSON, Tapio [FI/FI]; Korpisola 5 E, FIN-02300 Espoo (FI).  <b>(74) Agent:</b> SEPPO LAINE KY; Lönnrotinkatu 19 A, FIN-00120 Helsinki (FI).  <b>(81) Designated States:</b> AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).		<b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> ROLL IDENTIFICATION DEVICE AND METHOD FOR FABRICATING THE SAME  <div style="text-align: center;"> </div>		
<b>(57) Abstract</b>  <p>The invention concerns an identification device (10) for a roll (23) and a method for fabricating the same. The identification device (10) is intended for fixing to the end of the roll (23). According to the invention, the identification device comprises a first, essentially planar carrier base part (3) made of cellulosic material, a second, essentially planar carrier base part (5) made of cellulosic material, said part being adhered in an essentially coplanar manner to said first base part (3), two moisture-barrier layers (17) placed between said base parts (3 and 5), electronics circuitry (2, 4) sealed between said moisture-barrier layers (17), and fixing means (7, 9) for mounting the identification device (10) to the paper roll (23).</p>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CJ	Côte d'Ivoire	LJ	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

**Roll identification device and method for fabricating the same**

The present invention relates to a roll identification  
5 device according to the preamble of claim 1.

The invention also concerns a method for fabricating said roll identification device.

10 According to prior-art techniques, a roll-identifying label is placed on the paper rolls subsequent to their packaging at the paper mill, whereby the information written on the label gives sufficient identification of the roll such as the manufacturing date, roll weight,  
15 manufacturing mill, etc. Such a label may be damaged during transportation, whereby it is difficult if not impossible to obtain, e.g., feedback from the damaged lot which then could be used for improving the manufacturing process. Automated processing of information printed on  
20 the label is awkward, while optical readers capable of performing such a task are available. The optical read process presumes a high quality from the text, and even a slightest damage on the label during transportation can cause disturbance to such a process.

25

It is an object of the present invention to overcome the drawbacks of the above-described techniques and to provide an entirely novel roll identification device and a method for manufacturing the same.

30

The invention is based on providing the roll-identifying means by virtue of adapting a remote read/write identification device onto a corrugated board carrier in a moisture-proof manner.

35

More specifically, the device according to the invention is characterized by what is stated in the characterizing part of claim 1.

- 5 Furthermore, the method according to the invention is characterized by what is stated in the characterizing part of claim 6.

The invention provides significant benefits.

10

- The roll identification device according to the invention provides information from the roll in a noncontacting manner. Further, the information can be updated, whereby the transportation history of the roll can be traced. The  
15 design of the device is reasonably rigid and its electronic circuitry is sealed in a moisture-proof manner between plastic film sheets. Having a paper-based carrier, the device is easy to scrap, or alternatively, move for reuse. The corrugated board carrier is readily  
20 worked and its resilient structure provides efficient cushioning against external stresses. Further, recesses accommodating the electronics circuitry are easy to make on the corrugated board carrier.

- 25 In the following the invention is described in greater detail with reference to exemplifying embodiments illustrated in the annexed drawings in which

- Figure 1 shows a top view of an identification device  
30 according to the invention prior to its final forming and sealing.

Figure 2 shows a cutting pattern of a carrier material blank for the device according to the invention.

35

Figure 3 shows a cross-sectional side view of the carrier material structure employed in the manufacturing step illustrated in Fig. 2.

- 5 Figure 4 shows a cross-sectional side view of a detail of the device according to the invention.

Figure 5 shows a top view of the device according to the invention.

10

Figure 6 shows a perspective view of the placement of the device according to the invention in a paper roll.

- With reference to Fig. 1, a blank 1 for the roll identification device is comprised of circular cover parts connected by a bridging part 11, namely a bottom part 3 and a top part 5, both of which having tabs 7 and 9, respectively, for fixing the identification device in a paper roll. During the assembly phase, the cover parts 3 and 5 are bent over each other, whereby the bridging part 11 provides correct alignment of the cover parts 3 and 5. The electronics circuitry is placed between the cover parts 3 and 5. The tabs 7 and 9 form a single tab in this step.

25

- With reference to Fig. 2, a sheet 8 is worked by, e.g., stamping to separate therefrom blanks 1 of the identification device carrier with simultaneously formed tabs 7 and 9 as well as recesses (not shown) for the electronics circuitry.

30

- With reference to Fig. 3, the carrier material sheet illustrated in Fig. 2 comprises a base layer 13, a first adhesive layer 15 applied thereon, and a supporting layer 17 of polyester on the adhesive layer 15. Of commercially available products, the supporting layer 17 can be from a polyester or Kapton<sup>®</sup> film. Next, a second adhesive layer

35

19 and thereon a protective paper 21 are placed on the supporting layer. It must be noted that the relative thicknesses shown in Fig. 3 are disproportionately scaled.

5

With reference to Fig. 4, a recess 12 is made to the blank in conjunction with its stamping to accommodate a coil 4 of the electronics circuitry. For assembly, the protective paper shown in Fig. 3 is removed and the coil 4 with an electronics circuit (not shown) are adhered by pressing to the second adhesive layer 19. Finally, the top part 5 of the blank is bent tightly against the bottom part 3, whereby the electronics circuit and the coil 4 will be sealed in a moisture-proof manner between the film layers 17 adhered to each other by means of the adhesive layers 19.

With reference to Fig. 5, the finished roll identification device 10 is comprised of a layered structure, formed by the bottom part 3 and the top part 5, which encases sandwiched the coil 4 that acts as an antenna and power pickup element for the device, and the electronics circuit 2, which is connected by conductors 6 to the coil 4. When necessary the electronics circuit 2 is additionally secured with an adhesive (e.g., Sikaflex® or polyurethane) in the recess reserved for the circuit. The tabs 7 and 9 combine in the final form into a single tab.

With reference to Fig. 6, the tab 7 of the identification device 10 is inserted in the center hole 23 of a paper roll 23. The roll end headers are placed in a conventional manner to conceal the identification device.

The invention is characterized by the use of a cellulosic material for producing the carrier blanks. Replacing the corrugated board 13, any appropriately stiff yet flexible cardboard can be employed suited for easy working of the

recesses required to accommodate the electronics circuitry.

Basically, the parts 3 and 5 can be separate, while such  
5 an arrangement needs accurate alignment of the parts.  
Then, to reduce such alignment problems, the top part for  
instance can be formed by a single ring whose outer diameter is equal to the outer diameter of the bottom part 3  
and whose inner diameter is sufficiently large to leave  
10 the bottom part tab 7 entirely free and uncovered, yet  
sufficiently small to provide a moisture-proof sealable  
area for laminating the electronic circuit and the coil.

Without departing from the scope of the invention, the  
15 patterns of the parts 3 and 5 can be different from a  
circular shape.

When necessary the finished structure 10 can be additionally laminated.

**Claims:**

1. An identification device (10) for a roll (23) suited  
for mounting to the end of the roll (23), c h a r a c -  
5 t e r i z e d by comprising:
- a first, essentially planar carrier base part  
(3) made of cellulosic material,
  - 10 - a second, essentially planar carrier base  
part (5) made of cellulosic material, said part  
being adhered in an essentially coplanar manner  
to said first base part (3),
  - 15 - two moisture-barrier layers (17) placed  
between said base parts (3 and 5),
  - electronics circuitry (2, 4) sealed between  
said moisture-barrier layers (17), and
  - 20 - fixing means (7, 9) for mounting the identi-  
fication device (10) to the paper roll (23).
2. An apparatus as defined in claim 1, c h a r a c -  
25 t e r i z e d in that the carrier base parts (3, 5) are  
made from corrugated board.
3. An apparatus as defined in claim 1, c h a r a c -  
t e r i z e d in that the carrier base parts (3, 5) are  
30 connected to each other by means of a bridging part (11).
4. An apparatus as defined in claim 1, c h a r a c -  
t e r i z e d in that the moisture barrier layers (17)  
are joined to the adjacent elements (13, 4, 2) by  
35 adhesive layers (15, 19).



5. An apparatus as defined in claim 1, c h a r a c -  
t e r i z e d in that the electronics circuitry com-  
prises a coil (4) and an electronics circuit proper (2)  
connected to said coil.

5

6. A method for producing an identification device (10)  
intended for fixing to a roll (23), c h a r a c t e r -  
i z e d in that

10

- a sheet (8) is fabricated comprising

15

- a carrier base layer (13),
- a first adhesive layer (15),
- a moisture-barrier layer (17),
- a second adhesive layer (17), and
- a protective paper layer (21),

20

- the sheet (8) is stamped to obtain pieces (1) of  
desired shape which are simultaneously worked for
- forming fixing means (7, 9) to the pieces (1)  
suited for fixing the piece (1) to a roll (23),  
and
- recesses suited for accommodating the  
electronics circuitry (2, 4),

25

- the protective paper layer (21) is removed,
- the electronics circuitry (2, 4) is placed in the  
recesses reserved to accommodate said circuitry, and

30

- the pieces (1) stamped from said sheet are com-  
bined into a sandwich structure in which the elec-  
tronics circuitry (2, 4) is secured between the  
moisture-barrier layers (17) with the help of the  
adhering adhesive layers (19).

35

7. A method as defined in claim 6, c h a r a c t e r -  
i z e d in that the sheet (8) is stamped to form a blank  
shaped as two circular parts (3, 5) connected to each  
other.

5

8. A method as defined in claim 6, c h a r a c t e r -  
i z e d in that the sheet (8) is fabricated having its  
base layer (13) of corrugated board.

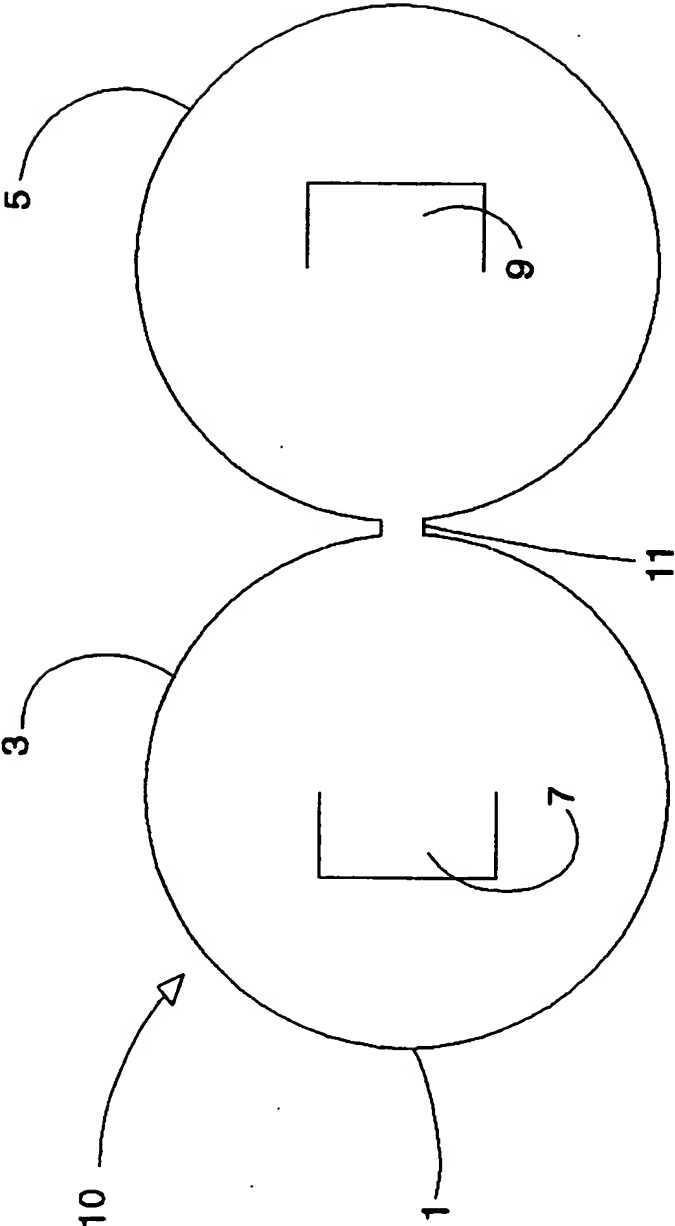


Fig. 1

2/6

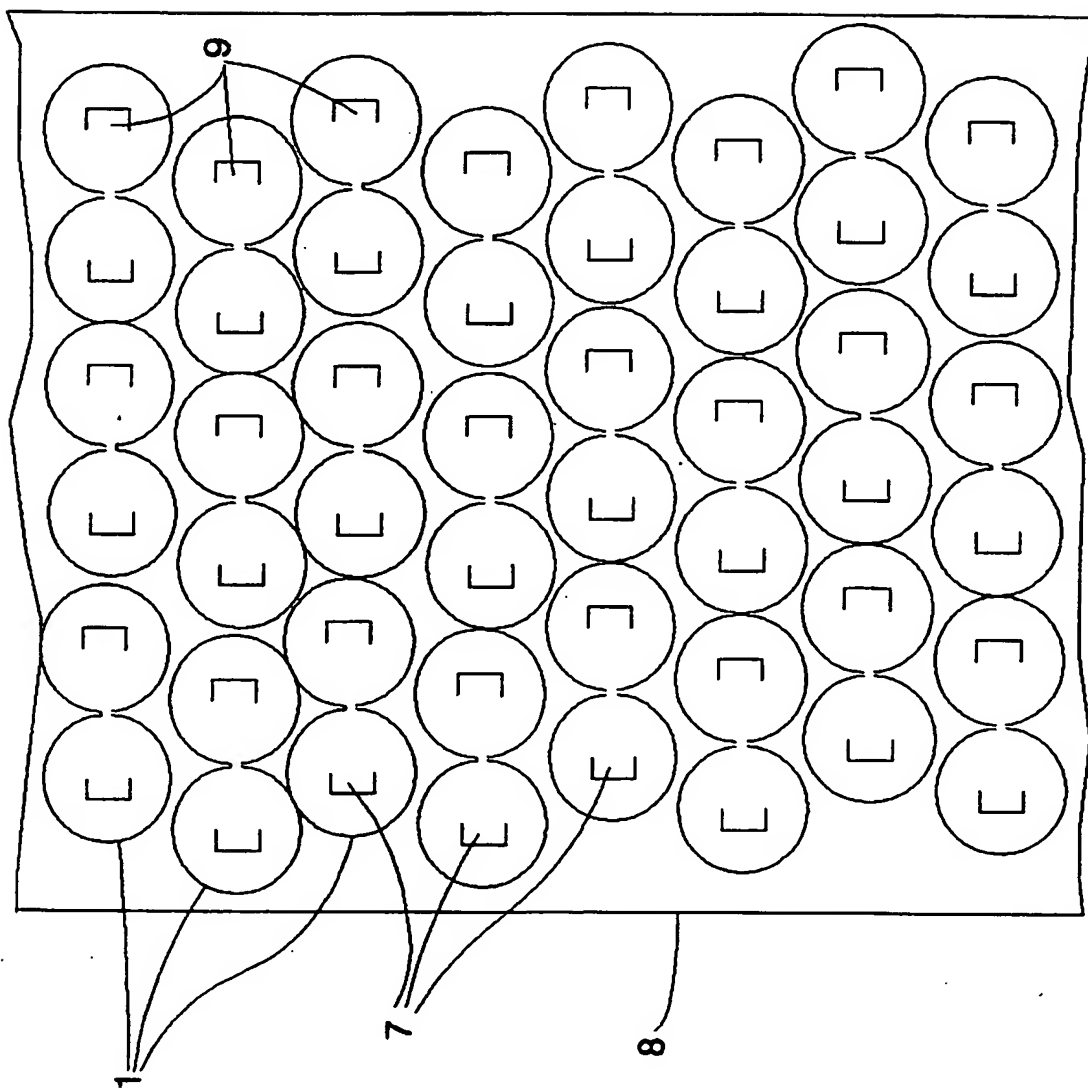


Fig. 2

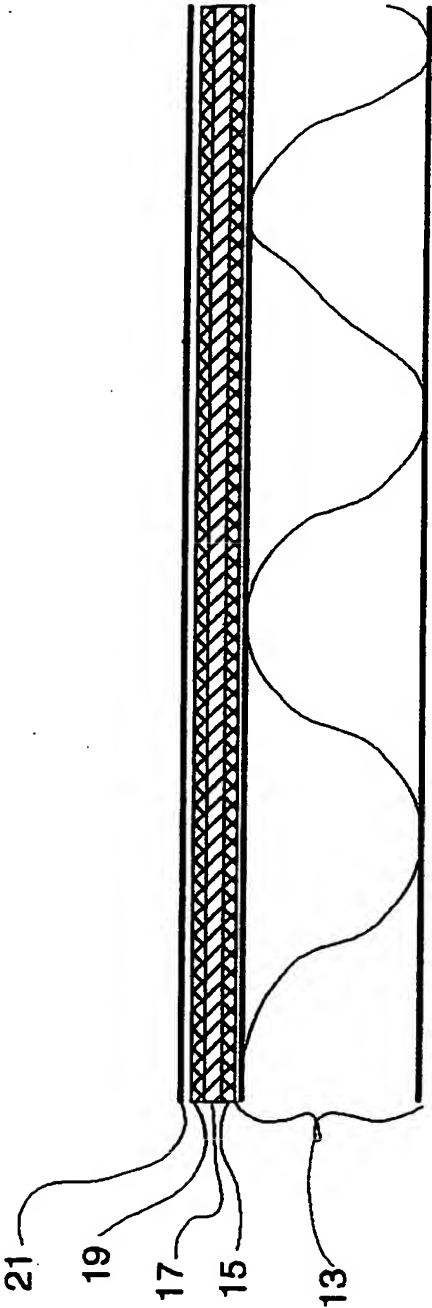


Fig. 3

4/6

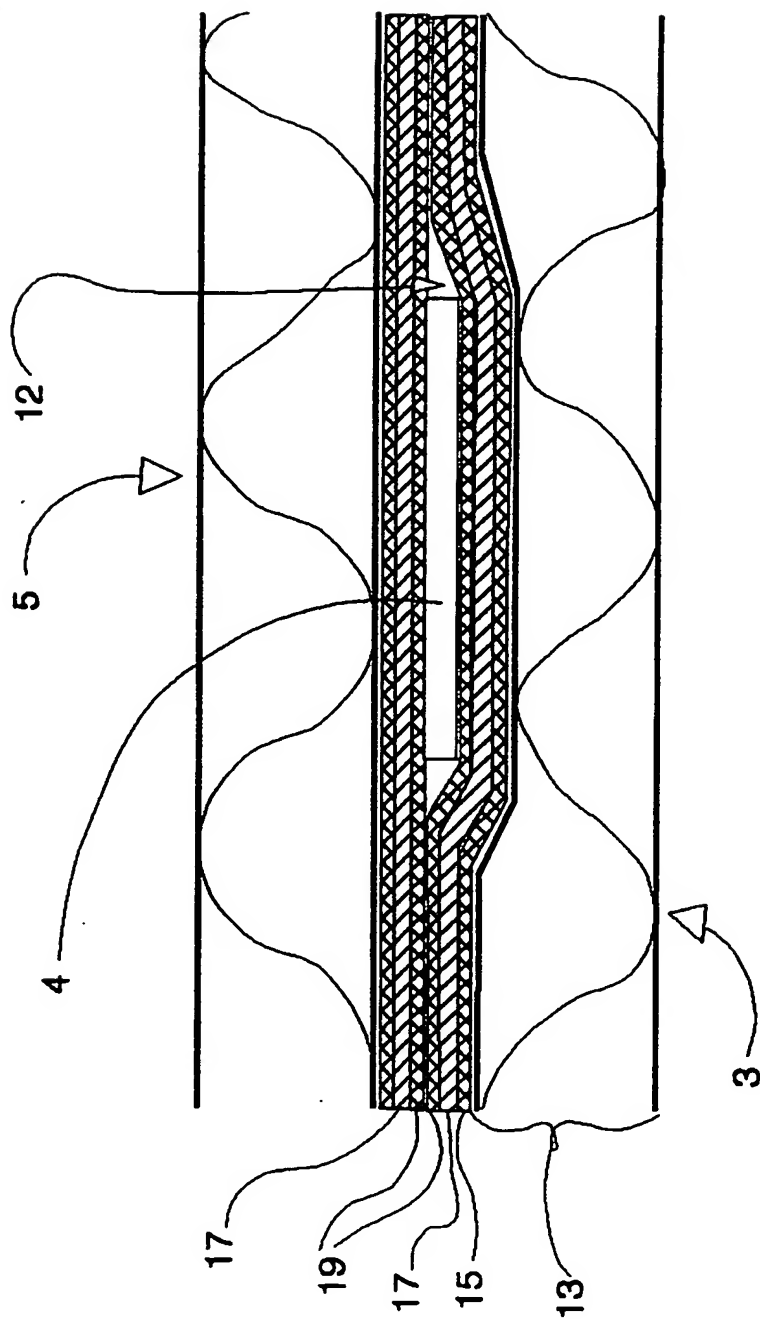


Fig. 4

5/6

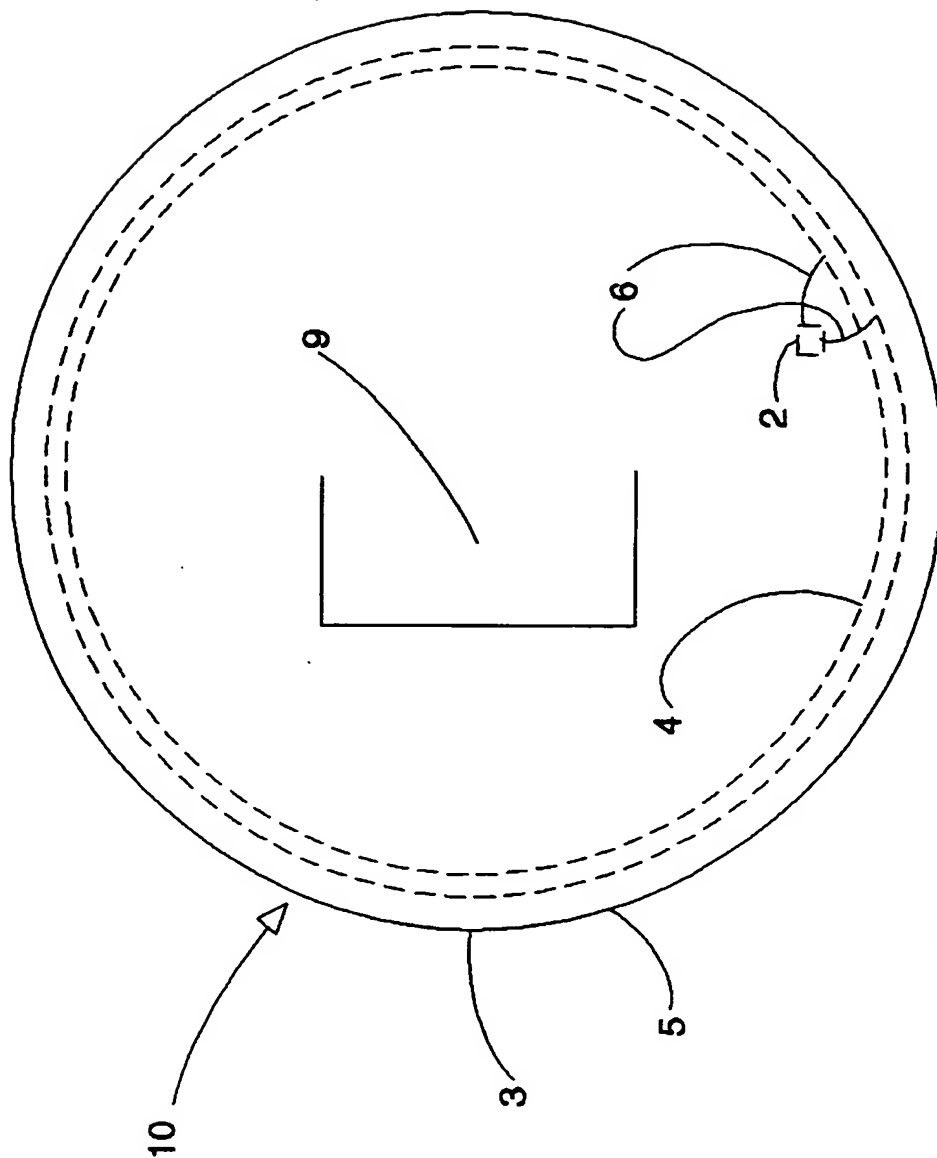


Fig. 5

6/6

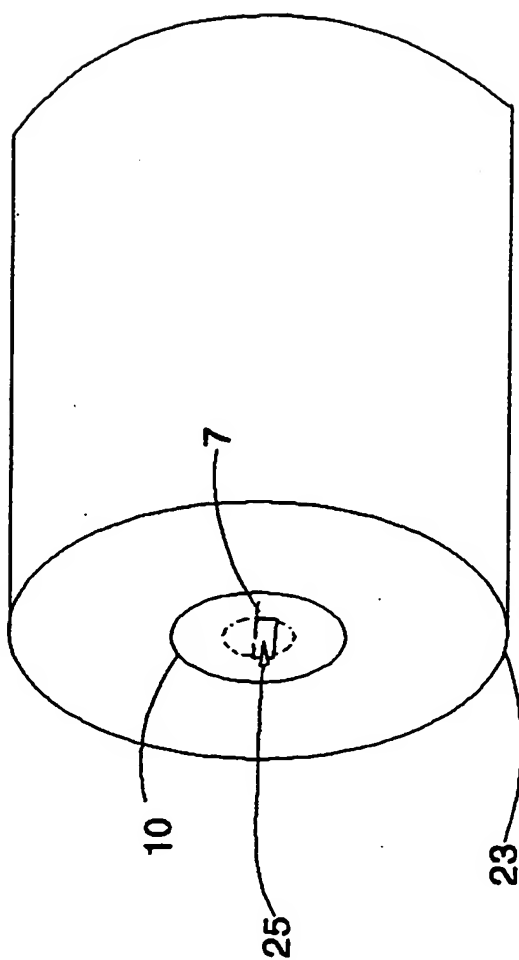


Fig. 6



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 93/00468

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: G06K 19/077

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: G06K, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4384288 (CHARLES A. WALTON), 17 May 1983 (17.05.83), column 1, line 1 - column 2, line 6, figures 1-5, abstract --	1-8
Y	WO, A1, 9118452 (HENOCH, BENGT), 28 November 1991 (28.11.91), abstract --	1-8
Y	DE, C2, 3029939 (GAO GESELLSCHAFT FÜR AUTOMATION UND ORGANISATION MBH), 1 June 1989 (01.06.89), figures 1-5, claims 1-11 --	1-8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

4 February 1994

09 -02- 1994

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer  
ROLAND LANDSTRÖM  
Telephone No. +46 8 782 25 00

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 93/00468

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP, A2, 0481776 (MITSUBISHI DENKI KABUSHIKI KAISHA), 22 April 1992 (22.04.92), column 3, line 31 - column 4, line 11, figures 1-2 —	1-8
A	US, A, 4463251 (PAULI KOUTONEN ET AL), 31 July 1984 (31.07.84), abstract — -----	1-8

## INTERNATIONAL SEARCH REPORT

Information on patent family members

30/12/93

International application No.

PCT/FI 93/00468

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US-A-	4384288	17/05/83	NONE		
WO-A1-	9118452	28/11/91	EP-A-	0528962	03/03/93
DE-C2-	3029939	01/06/89	BE-A-	889816	16/11/81
			CH-A,B-	654127	31/01/86
			FR-A,B-	2488427	12/02/82
			GB-A,B-	2081644	24/02/82
			JP-C-	1518448	07/09/89
			JP-A-	57052977	29/03/82
			NL-A-	8103597	01/03/82
			SE-B,C-	458645	17/04/89
			SE-A-	8104664	08/02/82
			US-A-	4450024	22/05/84
			US-A-	4617216	14/10/86
EP-A2-	0481776	22/04/92	JP-A-	4152191	26/05/92
US-A-	4463251	31/07/84	CA-A-	1185700	16/04/85
			DE-A,C-	3222654	05/01/83
			SE-B,C-	464672	27/05/91
			SE-A-	8203685	18/12/82